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Centre for Mathematics, Science and Technology Education in Africa (CEMASTEА) is a public institution under the Ministry of Education (MOE). The Centre is mandated to build the capacity of mathematics and science teachers for effective teaching and learning. The CEMASTEА's Research and Development (R&D) bulletin provides information and updates on researches undertaken and other activities for a given year. In this issue, updates and information are given for 2017. For more information, contact the Coordinator, R&D at [rdcoordinator2015@gmail.com](mailto:rdcoordinator2015@gmail.com)

**Research Findings**

**The Findings of a new study show that about a quarter of the available annual schooling time is used on non-learning activities.** The study conducted by CEMASTEА to understand the quantity and quality of teacher- students' interactions in schools. Phase I of this study which focused on the quantity of time teachers and students interacted was conducted in selected primary and secondary schools in three counties Kisumu, Uasin Gishu and Tharaka Nithi in Term 1 of 2017. The three counties represented an urban-rural spectrum based on the Commission for Revenue Allocation (2011) fact sheet with Kisumu County representing the urban counties, Uasin Gishu representing semi-urban counties and Tharaka Nithi representing rural counties. In total, 40 schools 20 each from the primary and secondary level participated in the study. The schools were distributed as follows: 10 schools five each from the primary and secondary level in Kisumu and Tharaka Nithi counties; and 20 schools 10 each from the primary and secondary level in Uasin Gishu County.

The study involved principals and head teachers of the selected schools as well as mathematics and science teachers in those schools. Also, selected Standard Five and Form Two students from the schools participated in the study. Data were collected from principals, head teachers, and teachers through questionnaires. Principals and head teachers were interviewed through a one-one semi structured interviews to understand about the school calendars, routines and mechanisms used to cover for any time loses. On the other hand, a focus group discussion was conducted with the students to understand from their point of view the activities in school and the time apportioned to them

The findings of the study are summarised as follows:

1. There is inconsistency between the available time for schooling as guided by the MOE and suggested time

for coverage of content in the syllabus. While the MOE guides that schools have 35 weeks of available time for learning, the syllabus (KIE, 2002) as drawn by the Kenya Institute of Curriculum Development (KICD) suggests a time for coverage of the syllabus of as high as 40 weeks.

2. Secondary schools that participated in the study spent an average of 29.5% of the school time per year on activities other than coverage of content as prescribed in the syllabus while primary schools utilised 28.6% on average on similar activities. The activities included: opening procedures such as issuing of text books and cleaning up the classes and school compound in general; closing procedures such as marking and preparation of report cards, cleaning up the classes and school compound in general, and examinations.
3. Schools employed a variety of coping strategies to compensate for official school time spent on non-learning activities. Notable were those strategies that encroached on students' right to breaks (i.e., health and lunch breaks) and recreational breaks such as games time. This was done by elongating the recommended teaching time of 35 minutes and 40 minutes per lesson for primary and secondary schools respectively to as long as one hour per lesson for primary schools and teaching an extra lesson during lunch time for secondary schools.

These findings provide the much-needed empirical data that should provoke debate regarding effective utilisation of available school time by schools. More important is the debate on the attainment of goals of education especially those emphasising learning for understanding against the backdrop of cognitive overloads that students are likely to experience as a result of learning with limited breaks. The findings call for a harmonisation of guidelines on available time by MOE and suggestions on the time needed to cover the content in the syllabus. It is recommended that MOE develops mechanisms for

monitoring how time is utilised in schools to ensure that students benefit from their time in school in meaningful ways.

### Monitoring and Evaluation of County INSET

In 2017, secondary in-service education and training (INSET) was conducted in April and August in 63 INSET centres of all the 47 counties. Monitoring and Evaluation (M&E) of the INSET was undertaken by CEMASTEAs staff to establish the quality of facilitation by County Trainers and management of the INSET by the County Teacher Capacity Development Committees (CTCDC). A total of 6633 out of the expected 7898 mathematics and science teachers were trained in. This number represented a percentage turn up of 83.9%. The findings of the M&E exercise showed that there was an improvement in overall quality of facilitation compared to 2017.



Figure 1: Maths teachers during INSET

The mean score for quality of facilitation was 3.98 compared to that of 2016 which was 3.91 on a scale of 1-5. This improvement in the score is likely to have risen from the fact that there was a deliberate effort to include preparation of PowerPoint slides by County trainers during National INSET. Indeed, majority of the County trainers were found to have good facilitation skills. The quality of management of INSET was equally good even though there was a drop in mean score from 4.00 for 2016 to 3.95 in 2017. A few INSET centres were found to have low standards of cleanliness.

At primary school level, INSET was held in selected counties involving selected teachers (2 teachers each from lower primary and upper primary respectively). A total of 855 out of the expected 1050 teachers were trained. This number represented 81.4 % turn out. Just



Figure 2: Teachers during Primary School INSET

like the Secondary INSET, the quality of facilitation and management of INSET were generally good at mean scores of 3.75 and 3.80 respectively.

### Conference Attendance and Presentations

Two papers were presented at international conferences as follows:

1. Dr. Grace Orado, Coordinator of R&D Department attended and presented a paper entitled ***“Teacher Professional Development as a Tool for Improving Pedagogy and Creating Communities of Practice among Teachers: The Case of SMASE Program of Kenya”*** during the 24<sup>th</sup> International Congress on

Learning at University of Hawaii at Manoa, Honolulu, USA held on 19-21, July 2017.

2. Mr. Kizito Makoba, Dean Biology Department and Mrs. Gladys Masai, Management Representative and Trainer in Chemistry Department presented a paper entitled ***“The Impact of Lesson Study on Improving Teachers’ Classroom Practice in Kenya: The Case of Kyamulendu Primary School, Machakos, Kenya”*** at a Conference on Distance Education and Teacher Training in Africa Kigali University of Education, Rwanda held on 21 - 25, August 2017.

### Research Resources

In 2017 CEMASTEAs secured access to online journals. Access to these journals will still be available to users in 2018. To access content in these journals simply type the link shown as follows and browse

- African Journal of Research in Mathematics, Science and Technology Education and African Journal of Science, Technology, Innovation and Development from <http://www.tandfonline.com/>
- All journals and periodicals from [www.jstor.org](http://www.jstor.org)

**Note: These journals are accessible only from CEMASTEAs**

### On-going Researches

Preparations for the Baseline study to determine the level of readiness of the next set of 47 STEM model schools, one in each of the 47 counties of Kenya is ongoing.

### Publications

A manuscript of a new book titled ***“Lesson Study: A practical guide for implementation”*** has been accepted for publication. Look out and use this book as a guided to improve the practice of Lesson Study by teachers. The writing of other books focusing on different issues is on-going.



Figure 3: Image of Lesson Study Book Cover

### Forums for Sharing Ideas

A Symposium for Primary Teachers Mathematics and Science Teachers’ was held in on 15-16 June 2017. A total of 121 participants who included 51 mathematics and science teachers attended the Symposium. The Symposium provided a forum for the teachers and other stakeholders to showcase and discuss about good classroom practices as well as innovative lessons and teaching and learning activities that can improve learning outcomes.



Figure 4: Participants during the Symposium

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